REMARKS

By this Amendment, claims 4, 6-9, 35 and 36 have been amended. No claims are cancelled or added. Accordingly, claims 2, 4, 6-9, 11, 35, 36, 40 and 41 are presented for further examination. No new matter has been added.

Claim Rejections – 35 USC § 112, Second Paragraph

Claims 2, 4, 6-9, 11, 35, 36, 40 and 41 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicants respectfully traverse the rejection.

The outstanding Office Action alleges that claim 1 is indefinite as to the "portion of copper of the core" that reacts with pyrithione. Specifically, the Office Action takes the position that it is not clear whether the "portion" refers to the amount/concentration or what constitutes the differentiating feature of a portion of a core. Although the Office Action refers to claim 1 in this rejection, it is respectfully believed that what it was intended are claims 2 and 41 since claim 1 was cancelled in the preliminary amendment submitted on February 15, 2002.

Instant claim 2 is directed to a biocidal composition comprising composite particles where each of the composite particles contains a shell and a core. The core consists essentially of a copper-containing compound and the shell consists essentially of a copper pyrithione which is formed by reaction of pyrithione acid or a water-soluble salt of pyrithione with a portion of copper in the core.

Inasmuch as only the copper in the surface portion of the core materials is available for the transchelation reaction with pyrithione acid or a water-soluble salt of pyrithione, the meaning of "a portion of" is not indefinite because a person skilled in the art would readily understand that it refers to the copper in the surface portion of the core. Similarly, claim 41 satisfies the written description requirement. Accordingly, the rejections as applied to these two claims should be withdrawn.

The outstanding Office Action also asserts that there is no-sequitur for "the total weight" of said composition in claim 4 and claims 6-9, "the core material" in claim 35; and "the weight ratio", e.g., in claim 36. Applicants respectfully submit that the amendments to these claims have rendered the rejection moot.

Double Patenting

Claims 2, 4, 6-9, 11, 35, 36, 40 and 41 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatable over claims of U.S. Patent No. 7026308 to Gavin et al. Applicants respectfully traverse the rejection.

Gavin et al. relates to a topical composition for treating microbes comprising: a) an anti-microbial active selected from the group consisting of polyvalent metal salts of pyrithione; b) a metal ion source, which can be copper salts; and c) a topical carrier for the anti-microbial active and the metal salt. An important feature of the compositions recited in the claims of Gavin et al. is that those compositions mandates the presence of at least a 5 to 1 ratio of polyvalent metal salt of pyrithione to a strong chelating agent wherein the strong chelating agent is selected from the group consisting of di- or polyamines, diethylene triamine penta-acetic acid, tetraethylene triamine, ethylene diamine, diethylene triamine or salts thereof or mixtures thereof.

In contrast, the instant claims are not directed to the presence or absence of any strong chelating agent. Rather they are directed to biocidal compositions comprising composite particles. Accordingly, the instant claims are clearly distinguishable from those of Gavin et al. Therefore, Applicants respectfully submit that the rejection is untenable and should be withdrawn.

Rejections under 35 USC §102

Claims 2, 4 and 6–9 stand rejected under 35 USC §102(b) as anticipated by, or in the alternative under 35 USC §103(a) as obvious over U.S. Patent No. 5,540,860 to Hosseini et al.

alone or if necessary, in further view of the specification and examples of that reference to demonstrate inherency. Applicants respectfully submit that this rejection is untenable and should be withdrawn.

The present invention is directed to solid composite particles having a core consisting essentially of surface oxidized copper power, cuprous oxide, copper hydroxide and combinations thereof and a shell consisting essentially of a copper pyrithione formed by reaction of pyrithione acid or a water-soluble salt of pyrithione with a portion of the copper in the core.

In contrast, Hosseini et al. relates to a process for producing a gel-free dispersion or solution of copper pyrithione employing at least one surfactant. The working examples of Hosseini et al. relate to the preparation of copper pyrithione. There is no suggestion in Hosseini et al of a composite particle having a core consisting essentially of surface oxidized copper power, cuprous oxide, copper hydroxide and combinations thereof as recited in instant claims.

It is stated at page 8 of the outstanding Office Action that a composite having a core and shell as claimed in the present invention must be inherently present in the Hosseini et al. particles. Applicants respectfully submit that the composite particles recited in the instant claims and the copper pyrithione particles disclosed in Hosseini et al. have different chemical structures because they are made from different copper compounds having different solubility.

Specifically, Applicants' claimed composite particles are produced from ***substantially insoluble*** copper compounds such as surface oxidized copper power, cuprous oxide, copper hydroxide and/or combinations thereof. During the transchelation reaction, these copper compounds are present as ***particles*** suspended in the reaction carrier as they are substantially insoluble. Under the reaction conditions of the present invention, some of the pyrithione anions from the soluble pyrithione salt or pyrithione acid chelate with the metal copper on the surface of these copper compound containing particles, thus forming a composite particle with a core of copper, cuprous oxide or copper hydroxide and a shell of copper pyrithione. The structure of the composite particle formed is confirmed by microscopic analysis and is shown at Fig. 2 of the present application.

In contrast, the Hosseini particles are made from a copper salt that is ***soluble in the reaction carrier***. (see Hosseini, col. 2, lines 59-60). Since the copper salt disclosed in Hosseini is soluble, in the reaction mixture, it exists as ***anions and cations*** separated by numerous solvent molecules, ions from the pyrithione salt and/or surfactants. Under the reaction conditions of the Hosseini process, copper pyrithione is formed from copper cations and pyrithione anions. Since copper pyrithione is highly insoluble, once it is formed, copper pyrithione precipitates out from the reaction mixture. The anions and cations of the copper salt, on the other hand, stay in the reaction mixture and are removed when the precipitate (copper pyrithione) is filtered and washed with plenty amount of solvent. Therefore, by utilizing soluble copper salts disclosed in Hosseini as the substrate in the chelation reaction, no composite particles are formed, but rather discrete particles of copper pyrithione. Accordingly, Hosseini does not disclose any composite particles, much less a composition containing such composite particles as recited in the instant claims.

In fact, Hosseini et al. teaches away from making any composite particles because the Hosseini reference specifically teaches the use of *a soluble* copper salt to prepare copper pyrithione. A person of ordinary skill in the art will appreciate that the purpose of this limitation is to ensure a complete removal of the soluble copper salt in the later work up process. Thus in light of this teaching, a person of ordinary skill in the art at the time of the invention was made would not be motivated or led to substitute *the soluble* copper salts disclosed in Hosseini et al. with a *substantially insoluble* surface oxidized copper power, cuprous oxide, copper hydroxide and combinations thereof as claimed in the present application. Accordingly, Hosseini does not disclose or suggest to one of ordinary skill in the art how to make or produce a biocidal composition comprising composite particles having a shell and a core, particularly particles wherein the core consists essentially of surface oxidized copper powder, cuprous oxide, copper hydroxide, and combinations thereof.

Since Hosseini et al. does not teach or suggest the instantly claimed biocidal composition, the outstanding claim rejection based upon this reference is untenable and should be withdrawn.

Rejections under 35 USC §103

1. Hosseini et al. and Gavin et al.

Claims 2, 4, 6–9, 11 and 41 are rejected under 35 USC 103(a) as being unpatentable over Hosseini et al. alone or in view of the specification and U.S. Patent No. 5,342,437 to Gavin et al.

As discussed in detail above, there is no disclosure or suggestion in Hosseini et al. of a composition comprising composite particles having a core consisting essentially of surface oxidized copper, cuprous oxide or copper hydroxide and a shell consisting essentially of copper pyrithione. Moreover, as the Examiner acknowledged in the Office Action, Hosseini et al. does not disclose a fatty acid coating of the shell.

Gavin et al. relate generally to paints and paint bases and disclose the incorporation of fatty acids into pyrithione-containing paint compositions in order to avoid gelation. However, Gavin et al. do not teach or suggest composite particles of any kind, much less of composite particles coated with a fatty acid as claimed in instant claims 41 and 11.

The rejection based on the combination of Hosseini et al. and Gavin et al. references is untenable since the result sought to be achieved by the combination of the references does not disclose or suggest a biocidal composition comprising composite particles containing a shell and core, as claimed in the instant application. Specifically, even if a person skilled in the art did utilize a fatty acid in the Hosseini process as suggested by the Examiner, the particles formed would be simple copper pyrithione coated with a fatty acid, which is completely different from the composite particles in the instant claims. Accordingly, when viewed singly or in combination, neither reference suggests composite particles of the instantly claimed invention. Accordingly, the rejection of the instant claims based upon that combination is believed to be untenable and should be withdrawn.

2. Hosseini et al. and Kappock et al.

Claims 2, 4, 6–9, 35, 36 and 40 are rejected under 35 USC §103(a) as being unpatentable over Hosseini et al. alone or in view of the specification (e.g. page 7, figures and examples) and examples (e.g. example 1) to demonstrate inherency and Kappock et al. U.S. Patent No.

5,518,774 (5/96). Applicants respectfully submit that this rejection is untenable and should be withdrawn.

The Hosseini reference which is discussed in more detail above, teaches gel free copper pyrithione particles formed by reacting soluble pyrithione salt and soluble copper salt in an ion-exchange reaction.

Kappock et al. teaches transchelation of copper oxide with a soluble pyrithione salt to produce an insoluble pyrithione salt such as copper pyrithione in a formulated paint composition to provide in-can preservation during storage of the paint. (See col. 3, lines 12-32) This disclosure does not teach or suggest copper pyrithione in a composite particle having a core consisting essentially of surface-oxidized copper powder, cuprous oxide, copper hydroxide and combinations thereof.

Since Hosseini et al. specifically teaches the use of soluble copper compound and it is well known that copper oxide is an insoluble compound, there is no motivation for a person skilled in the art to substitute the soluble copper compound required by Hosseini et al. process with an insoluble copper compound such as copper oxide disclosed in Hosseini et al. Doing so will be against the specific teachings of Hosseini et al. Further, contrary to the assertion of the outstanding Office Action, the "dry-film" and the "in-can" preservation property of the Kappock compositions is not attributable to the presence of copper oxide, rather it is due to the presence of soluble pyrithione in the composition and the insoluble pyrithiones formed thereafter. Accordingly, a person skilled in the art would not be motivated or led to modify the Hosseini particles in view of the teaching of Kappock or to combine the teachings of Hosseini et al. and Kappock et al.

In addition, Kappock et al. disclose the use of copper oxide and copper sulfate in the patentee's composition. Applicants respectfully submit that copper oxide normally refers to copper (II) oxide, which differs from cuprous oxide. Accordingly, Kappock et al. does not disclose or suggest any of the core materials recited in the composite particles, namely, cuprous oxide, surface oxidized copper powder, copper hydroxide, and combinations thereof. Therefore, even if the teachings of Hosseini et al. and Kappock et al. were combined, the combination

would not disclose or suggest any composite particles containing a core consisting essentially of surface oxidized copper powder, cuprous oxide, copper hydroxide, and combinations thereof. Accordingly, Applicants respectfully submit that this rejection is untenable and should be withdrawn.

In summary, Applicants submit that none of the references, alone or in combination, anticipate or make obvious the invention as presently claimed and that the application is now in condition for allowance. Therefore, Applicants respectfully request consideration of the amended claims, and an early receipt of a Notice of Allowance of the claims as amended.

CONCLUSION

Applicants respectfully request consideration of the claims in their amended form, and an early receipt of a Notice of Allowance thereof. Any fees due with this Reply may be charged to our Deposit Account No. 23-1665 under Customer Number 27267.

Respectfully submitted,
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